

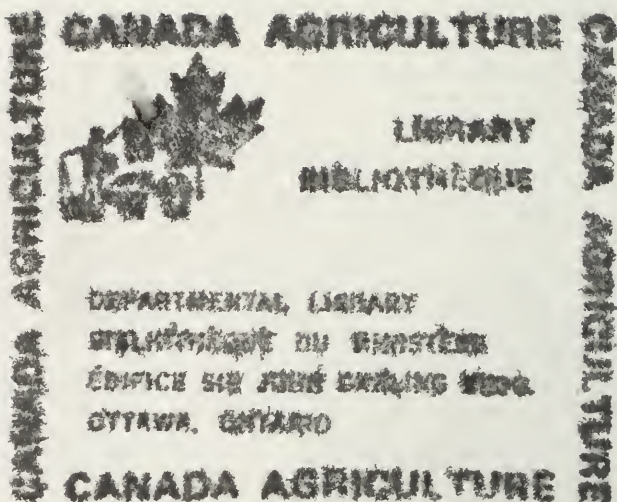
Ferns of the ottawa district



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Ferns of the ottawa district

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CANADA DEPARTMENT OF AGRICULTURE
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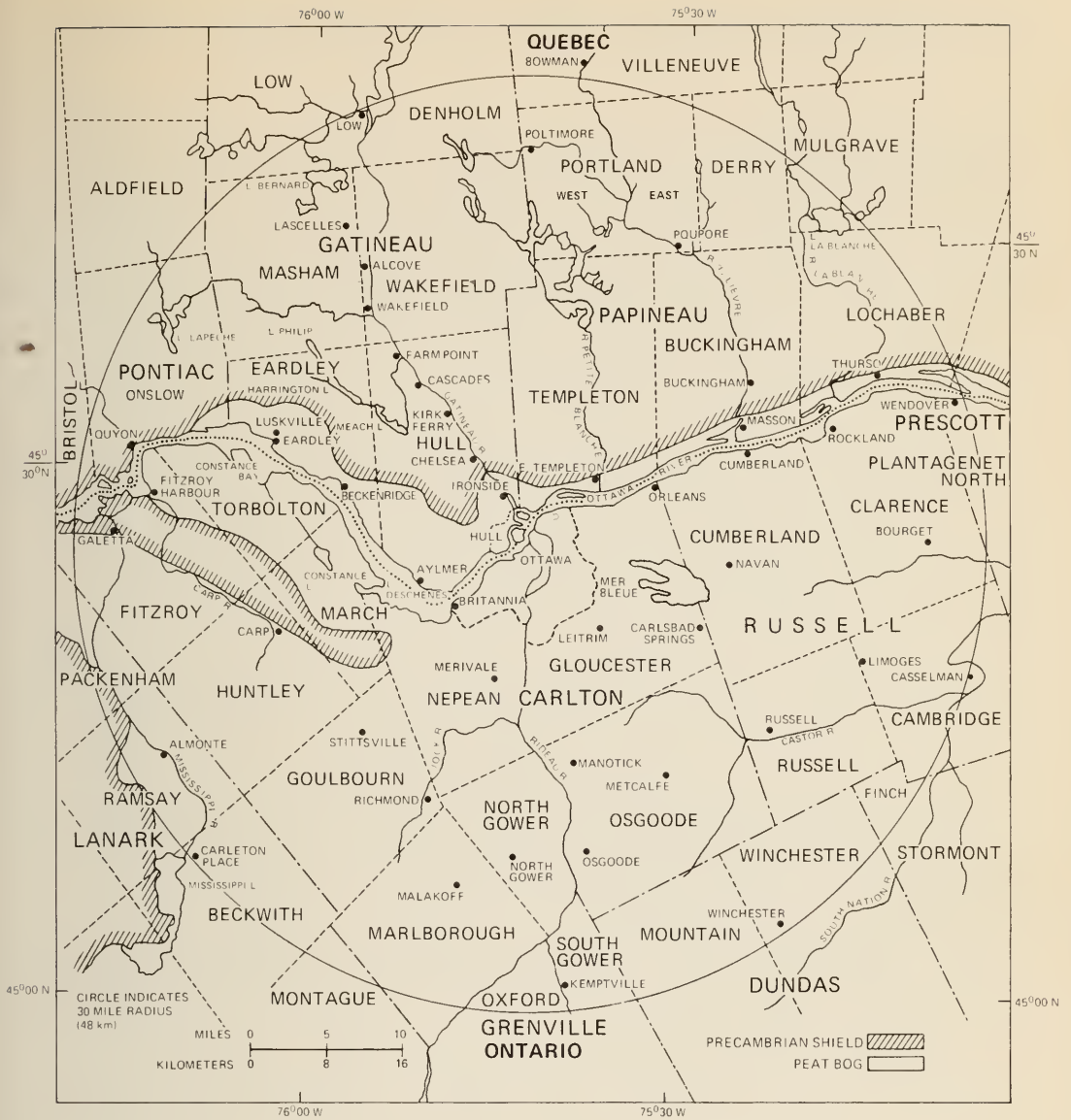
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LINEAR		
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centimetre (cm)	x 0.39	inch
metre (m)	x 3.28	feet
kilometre (km)	x 0.62	mile
AREA		
square centimetre (cm ²)	x 0.15	square inch
square metre (m ²)	x 1.2	square yard
square kilometre (km ²)	x 0.39	square mile
hectare (ha)	x 2.5	acres
VOLUME		
cubic centimetre (cm ³)	x 0.06	cubic inch
cubic metre (m ³)	x 35.31	cubic feet
	x 1.31	cubic yard
CAPACITY		
litre (L)	x 28.3	cubic feet
hectolitre (hL)	x 22	gallons
	x 2.5	bushels
WEIGHT		
gram (g)	x 0.04	oz avdp
kilogram (kg)	x 2.2	lb avdp
tonne (t)	x 1.1	short ton
AGRICULTURAL		
litres per hectare (L/ha)	x 0.089	gallons per acre
	x 0.357	quarts per acre
	x 0.71	pints per acre
millilitres per hectare (mL/ha)	x 0.014	fl oz per acre
tonnes per hectare (t/ha)	x 0.45	tons per acre
kilograms per hectare (kg/ha)	x 0.89	lb per acre
grams per hectare (g/ha)	x 0.014	oz avdp per acre
plants per hectare (plants/ha)	x 0.405	plants per acre



PREFACE TO THE REVISED EDITION

When the first edition of this book was published in 1956, it was thought that little would be forthcoming in future years except for a few more dots on the distribution maps. In recent years, however, a total of five species have been discovered within the 48 km (30 mi) radius of the center of Ottawa. These species are *Pellaea atropurpurea*, which was suggested in the earlier edition as a species that might be found, and *P. glabella*, *Woodsia obtusa*, *W. oregana*, and *Asplenium platyneuron*. All these findings are considerable extensions from the previously known ranges.

In this revised edition, an attempt has been made to update the nomenclature. *Gymnocarpium dryopteris*, *Phegopteris connectilis*, and *Thelypteris palustris*, which were included in the genus *Dryopteris*, have been segregated, and some descriptions and keys have been revised. Although most modern authors now separate many of the genera treated here in the Polypodiaceae into various families, it was felt best not to do so here.

The distribution maps have been updated by the inclusion of new records found in the Canada Department of Agriculture and National Museum herbaria, and recent papers published in *The Canadian Field-Naturalist* and *Trail and Landscape*.

Although recent political decisions have brought about the creation of the Regional Municipality of Ottawa-Carleton from Carleton County and a part of Russell County, for reasons of convenience the old counties have been retained.

Thanks are expressed to those who contributed the specimens and records that made this revision possible, particularly C. Frankton, D. Lafontaine, and D. Brunton.

INTRODUCTION TO THE FIRST EDITION

The ferns of the Ottawa District have been under study for over 75 years. Several lists of species found in the District have been prepared¹, but no flora with keys and descriptions has ever been published. An attempt is made here to bring together the known information on the ferns of this region and to provide a means by which interested persons may become familiar with them. For the purposes of this manual the Ottawa District is defined as the circular area surrounding the City of Ottawa, Ontario, having a radius of 30 miles. Although the area under consideration is limited, the information is applicable to a much wider area of Ontario and Quebec.

The ferns are well represented in the Ottawa District. Three families, comprising 18 genera, 36 species, one hybrid, and several varieties and forms are treated. Keys, descriptions, and a photograph of each species are provided so that the species may be easily distinguished. Notes on habitat, abundance, and economic importance have also been included, as well as maps showing the localities from which specimens have been collected. If a species cannot easily be observed throughout the growing season, dates when it may be collected are given.

Many of the species treated, such as *Botrychium virginianum*, *Dryopteris spinulosa*, *Athyrium filix-femina*, and *Pteridium aquilinum*, are of wide distribution throughout North America and are extremely common and widespread throughout the Ottawa District. Some species are rather rare and are only occasionally seen. In most cases their localized distribution may be accounted for by the requirements of a specialized habitat or suitable climate. A number are probably at the northern limit of their range. In this group are included such species as *Botrychium simplex* var. *tenebrosum*, *Ophioglossum vulgatum* var. *pseudopodium*, *Dryopteris goldiana*, *Polystichum braunii* var. *purshii*, *Athyrium pycnocarpon*, *Camptosorus rhizophyllus*, *Cryptogramma stelleri*, and *Woodwardia virginica*. Another species which reaches its northern limit in the Ottawa Valley is *Pellaea atropurpurea*. It has been collected at Campbell's Bay in Pontiac County, but is yet unknown in the District.

Ten counties are represented in the 2800 sq miles of the Ottawa District (Frontispiece). Gatineau and Papineau counties make up most

¹ For a discussion of the more important of these lists see: Boivin, B., and Cody, W. J. 1955. Bibliographic survey of James Fletcher's *Flora Ottawaensis*. Can. Field-Nat. 69(3):79-82.

of that part of the District situated in Quebec. Only parts of two townships of Pontiac County are included. South of the Ottawa River, Carleton and Russell counties cover most of the area, but on the periphery are parts of five other counties: Dundas, Grenville, Lanark, Prescott, and Stormont. The counties from which specimens have been seen are listed following the notes on habitat. Localities are given only when the species is of rare occurrence.

In recent years various members of the staff of the Botany and Plant Pathology Division, Canada Department of Agriculture, have carried out extensive collecting in the Ottawa District with the result that considerable information on local pteridophytes has been gathered. Members of the Fern Group of The Ottawa Field-Naturalists' Club have also been active in the last few years, both in collecting specimens and in making observations. This group was responsible for the rediscovery of *Athyrium pycnocarpon* and *Polystichum braunii* var. *purshii*, both unknown for many years, and for a new record for the District, *Botrychium lanceolatum* var. *angustisegmentum*.

Specimens in the Herbarium of the Botany and Plant Pathology Division have formed the basis for this manual. Herbarium sheets in the National Museum of Canada, Ottawa, and the Botanical Institute of the University of Montreal, Montreal, have also been consulted. In addition, the Transactions of the Ottawa Field-Naturalists' Club, the Ottawa Naturalist, and The Canadian Field-Naturalist have been thoroughly searched for references to the occurrence of ferns in the Ottawa District.

The writer gratefully acknowledges the many helpful suggestions offered by his associates. Special thanks are also due to the late Mr. C. A. Weatherby and to Dr. R. T. Clausen for the examination of critical material.

KEY TO THE FAMILIES

- A. Sporangia exposed on entirely fertile fronds or parts of fronds.
 - B. Sporangia borne on a stalked terminal spike or panicle that arises from the base of the vegetative blade
..... OPHIOGLOSSACEAE, p. 7
 - B. Sporangia borne on modified segments of the vegetative fronds or on entirely separate fertile fronds
..... OSMUNDACEAE, p. 26
- A. Sporangia borne in clusters on the back of occasionally slightly modified fronds or inside berrylike or tube-shaped divisions of modified fronds POLYPODIACEAE, p. 34

OPHIOGLOSSACEAE ADDER’S-TONGUE FAMILY

Perennial, more or less succulent herbs; sporophyte with a short rhizome bearing one or more stalked or sessile fronds, and a fertile spike or panicle; sporangia naked, bivalvate, producing thick-walled spores; gametophyte subterranean, usually without chlorophyll and associated with an endophytic mycorrhiza. Two genera are known to occur in the Ottawa District.

- A. Sporangia separate in a pinnate, a compound, or rarely, a simple spike; sterile segments of fronds not simple; veins free *Botrychium*, p. 8
- A. Sporangia cohering in a simple spike; fronds simple, entire, usually one; veins reticulate *Ophioglossum*, p. 22

BOTRYCHIUM

Sporophyte bearing one to several fronds from an erect unbranched rootstock; roots thick and fleshy; sterile segment sessile or stalked, in our species pinnately or palmately once to many times decom-
pound, venation dichotomous, open; fertile segment stalked, the spike
simple (rarely) to pinnately compound; sporangia naked and distinct,
borne laterally on its branches. Six species are known to occur in
the Ottawa District.

- A. Fronds various (generally less than 20 cm wide), more or less
fleshy, sessile or petioled.
 - B. Fronds rather large, ternately compound, usually long-
petioled.
 - C. Fronds with all the segments the same size and shape
..... 1. *B. multifidum*
 - C. Fronds with segments of different sizes and shapes; the
chief terminal divisions usually elongate 2. *B. dissectum*
 - B. Fronds usually small, pinnately or palmately divided; rather
simple, sessile or short-petioled.
 - D. Fronds broadly deltoid, sessile at the base of the
fertile segment 5. *B. lanceolatum* var. *angustisegmentum*
 - D. Fronds oblong to narrowly deltoid, or ovate, sessile
or short-petioled, borne above the middle of the stalk.
 - E. Fronds simple or once pinnate 3. *B. simplex* var. *tenebrosum*
 - E. Fronds pinnate to pinnate-pinnatifid 4. *B. matricariaefolium* var. *matricariaefolium*
- A. Fronds broadly deltoid (5)–14–25–(32)² cm wide, thin, mem-
branous, sessile 6. *B. virginianum* var. *virginianum*

²Figures in brackets represent extremes of size not often found.



Fig. 1. *Botrychium multifidum* var. *multifidum* (Leathery Grape Fern)

1. BOTRYCHIUM MULTIFIDUM (Gmel.) Rupr. (Fig. 1, 2)

LEATHERY GRAPE FERN

Plant 10–35 cm high with coriaceous stem and blade; blade ever-green, long-petioled, attached near the base of the plant, ternate, the ultimate divisions somewhat imbricated, more or less the same size and shape, obtuse.

Two varieties are present in the District.

Var. *multifidum* (Fig. 1), plant 10–14 cm high; blade 2.3–5.6 cm wide, 2.3–4.0 cm long; rare, only two collections in the District.

QUEBEC: GATINEAU COUNTY, 1.6 km west of Old Chelsea.

ONTARIO: CARLETON COUNTY, Merivale.

Var. *intermedium* (D. C. Eat.) Farw. (*B. silaifolium* Presl) (Fig. 2), plant (18)–23–31–(35) cm high; blade (8.5)–10.0–15.0–(19.0) cm wide, (6.5)–8.0–13.0–(15.0) cm long; fairly frequent, found in sandy places, along borders of woods, on dry hillsides, and in open fields and pastures throughout the District.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, LANARK, and RUSSELL COUNTIES.



Botrychium multifidum incl. var. *intermedium*



Fig. 2. *Botrychium multifidum* var. *intermedium* (Leathery Grape Fern)

2. *BOTRYCHIUM DISSECTUM* Spreng. (Fig. 3, 4)

CUT-LEAVED GRAPE FERN

Plant 8–27 cm high with stem and blade less coriaceous than *B. multifidum*; blades long-petioled, triangular, attached at or near the base of the plant, ternate, (2.2)–4.0–7.0–(11.0) cm long, (2.3)–4.6–11.3–(17.0) cm wide, the ultimate divisions of varying sizes and shapes.

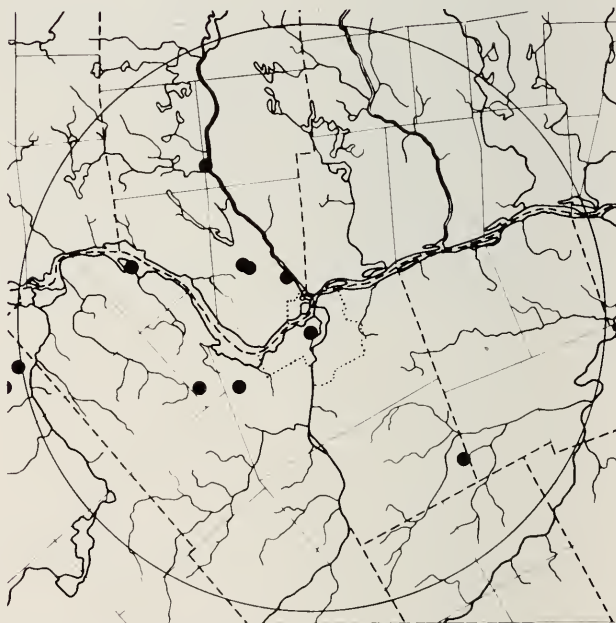
Three varieties based on leaf form are found in the District. These varieties pass freely from one to another so that it is sometimes difficult to decide to which variety a particular specimen should be assigned.

Var. *dissectum* (Fig. 3), ultimate divisions of the blade cut in linear segments, the segments more or less notched at the apex.

This variety is very rare in the District, but it occurs in a number of habitats, such as sterile hilltops, dry pastures, dry woodlands, and grassy banks. The collections seen were made between August 6 and October 13.

QUEBEC: GATINEAU COUNTY, Ironsides.

ONTARIO: CARLETON COUNTY, Constance Bay and Kenmore; LANARK and RUSSELL COUNTIES (Clausen, R. T. 1938. Monograph of the Ophioglossaceae. Mem. Tor. Bot. Club 19:57).



Botrychium dissectum var. *dissectum*



Fig. 3. *Botrychium dissectum* var. *dissectum* (Cut-leaved Grape Fern)

Var. *obliquum* (Muhl.) Clute (*B. dissectum* forma *obliquum* (Muhl.) Fern., *B. obliquum* Muhl.) (Fig. 4), ultimate divisions of the blade not dissected, but variously and unevenly cut; divisions of the pinnae oblong-ovate to oblong-lanceolate, more or less acute.

This variety is more frequent than var. *dissectum*, but still rare; it is found in similar habitats. In the District it is known on the Ontario side of the Ottawa River from only one locality, but additional localities are to be expected. The collections seen were made between August 10 and October 20.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: LANARK COUNTY.

Var. *oneidense* (Gilbert) Farw. (*B. dissectum* forma *oneidense* (Gilbert) Clute), ultimate divisions of the blade not dissected, but variously and unevenly cut; divisions of the pinnae broadly ovate and obtuse.

This variety is very rare and occurs in moist rich woodland soil, where it is usually found late in the season.

QUEBEC: GATINEAU COUNTY, Cantley and Kirks Ferry.

ONTARIO: CARLETON COUNTY, Kenmore.



Botrychium dissectum var. *obliquum*



Botrychium dissectum var. *oneidense*



Fig. 4. *Botrychium dissectum* var. *obliquum* (Cut-leaved Grape Fern)

3. BOTRYCHIUM SIMPLEX E. Hitchc. var. **TENEBROSUM**
(A. A. Eat.) Clausen (Fig. 5)

SMALL GRAPE FERN

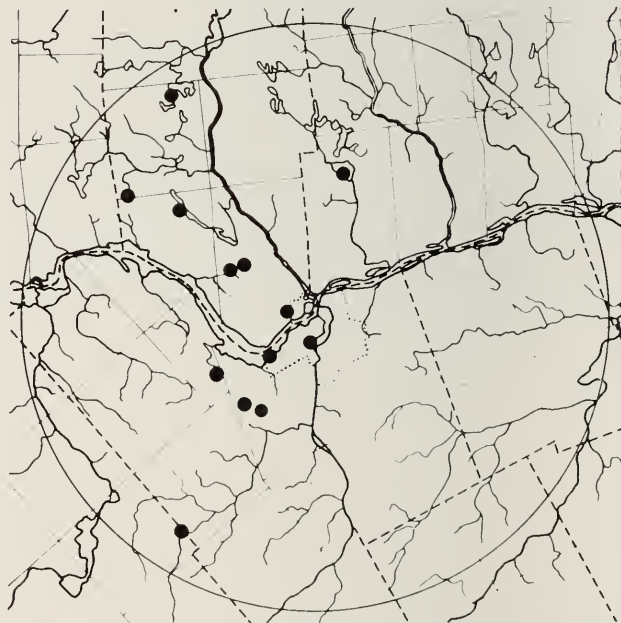
Plant 5–14 cm high; blade oblong, simple to once pinnate, attached near the summit; blade and petiole 0.7–3.5 cm long.

This fern is rare and is found in damp, usually heavily shaded woods and at the edges of deep swamps.

QUEBEC: GATINEAU COUNTY, Pink Lake; PAPINEAU COUNTY, McGregor Lake.

ONTARIO: CARLETON COUNTY, Britannia, South March, and Wright's Grove; LANARK COUNTY.

Botrychium lunaria is recorded in Ott. Nat. 12:188, 1899, as "found by Mr. J. M. Macoun to be locally abundant on the railway embankment near Stittsville." No specimens authenticating this record have been found, and because there have been no other collections of this species in the Ottawa District, either before or since, this record is here referred to *B. simplex*. Plants with a sterile blade attached near the base, which were observed and photographed south of Bell's Corners (Trail and Landscape 8(4):102. 1974), may have represented *B. simplex* var. *simplex*. A collection by C. and E. Frankton from 3.2 km southwest of Bell's Corners in 1972 approaches that variety.



Botrychium simplex var. *tenebrosum*



Fig. 5. *Botrychium simplex* var. *tenebrosum* (Small Grape Fern)

4. BOTRYCHIUM MATRICARIAEFOLIUM A. Br. var. **MATRICARIAEFOLIUM** (Fig. 6)

BRANCHING GRAPE FERN

Plant 10–28 cm high; blade narrowly deltoid to ovate, short-stalked, 1.4–8.0 cm long, 1.1–2.7 cm wide, pinnatifid to bipinnate-pinnatifid, the segments blunt and usually toothed.

This fern is rare in the District but is found in a variety of habitats, such as old sandy and sterile fields, dry wooded slopes, rocky woods, moist cedar woods, and rich swamps.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, GRENVILLE, LANARK, and RUSSELL COUNTIES.



Botrychium matricariaefolium
var. *matricariaefolium*



Fig. 6. *Botrychium matricariaefolium* var. *matricariaefolium*
(Branching Grape Fern)

5. BOTRYCHIUM LANCEOLATUM (Gmel.) Ångstr. var.
ANGUSTISEGMENTUM Pease & Moore (Fig. 7)

LANCE-LEAVED GRAPE FERN

Plant 6.5–12.0 cm high; blade broadly deltoid, sessile at the base of the fertile segment, 0.7–2.3 cm long, 0.5–2.5 cm wide; pinnae lanceolate, pinnatifid.

This fern is rare in the District.

QUEBEC: GATINEAU COUNTY, Meach Lake, Penguin Trail between Kingsmere and Old Chelsea, and Kingsmere.

ONTARIO: CARLETON COUNTY, Kanata.

In addition, there is a record of *B. lanceolatum* from Casselman, just outside the District, by Macoun, Whyte, and Fletcher (Trans. Ott. Field-Nat. Club 5:123. 1884), but no specimens authenticating this record could be found in any of the herbaria examined.



Botrychium lanceolatum var. *angustisegmentum*



Fig. 7. *Botrychium lanceolatum* var. *angustisegmentum* (Lance-leaved Grape Fern)

6. **BOTRYCHIUM VIRGINIANUM** (L.) Sw. var. **VIRGINIANUM** (Fig. 8)

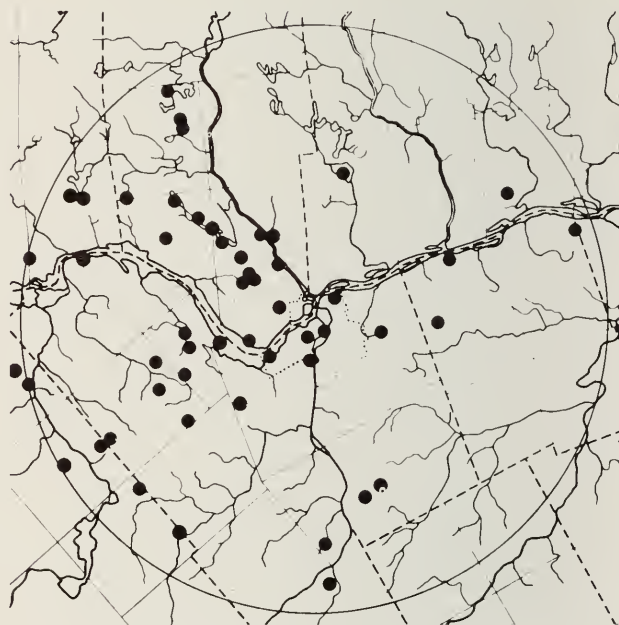
RATTLESNAKE FERN

Plant (20)–25–35–(50) cm high; blades broadly deltoid, sessile, attached above the middle, (5)–14–25–(32) cm wide, (4)–10–18–(23) cm long, bipinnate to tripinnate, the ultimate segments oblong-lanceolate, toothed, membranous or slightly fleshy.

This fern is fairly frequent and is the most common of all the *Botrychiums*. It is usually found in dry or somewhat moist deciduous woodlands, but occasionally it occurs in wet cedar woods and boggy areas. Our collections were made before the end of July.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, GRENVILLE, LANARK, and RUSSELL COUNTIES.



Botrychium virginianum var. *virginianum*

OPHIOGLOSSUM

Sporophyte bearing usually one frond from an erect rootstock; sterile segment sessile, glabrous, entire; fertile segment a simple stalked spike bearing two rows of cohering sporangia. Only one species is found in the Ottawa District.



Fig. 8. *Botrychium virginianum* var. *virginianum* (Rattlesnake Fern)

1. OPHIOGLOSSUM VULGATUM L. var. PSEUDOPODUM
(Blake) Farw. (Fig. 9)

ADDER'S-TONGUE

Plant 13–25 cm high; blade attached near the middle, varying in shape from broadly lanceolate to ovate to oblanceolate, 4.0–9.5 cm long, 1.5–3.0 cm wide.

Because it is usually hidden among other vegetation, this fern is perhaps often overlooked. A mass occurrence was discovered near Ramsayville in 1966 (Can. Field-Nat. 81:186-188. 1967), and since 1956, has been found at a number of other localities. It occurs in bogs, moist humus-rich depressions, wet meadows, and sometimes on grassy hillsides and high dry sunny locations.

QUEBEC: GATINEAU COUNTY, Beaver Meadow, Hull, and Pink Lake;
PAPINEAU COUNTY, Lac la Blanche; PONTIAC COUNTY,
Pontiac Bay.

ONTARIO: CARLETON, GRENVILLE, LANARK, and RUSSELL COUN-
TIES.

The highest chromosome number known to occur in a North American plant, $2n = \text{ca } 960$, was counted from spore mother cells collected from a stand near Ramsayville (Can. Field-Nat. 83:277-278. 1969).



Ophioglossum vulgatum var. *pseudopodium*



Fig. 9. *Ophioglossum vulgatum* var. *pseudopodium* (Adder's-tongue)

OSMUNDACEAE

FLOWERING FERN FAMILY

Tall perennial ferns of marshy places, frequently in large clumps; fertile fronds surrounded by sterile ones; rootstocks creeping or sub-erect; fronds with stipes winged at the base; blades with free, usually forked veins extending to the margins; sporangia naked, large, globose, bivalved, borne on modified, contracted pinnae. One genus is found in the Ottawa District.

OSMUNDA

Description as for the family. Three species occur in the Ottawa District.

- A. Fronds bipinnate, some of them fertile at the tip, pinnules finely toothed 1. *O. regalis* var. *spectabilis*
- A. Fronds pinnate, the sterile pinnae deeply pinnatifid, lobes usually entire.
 - B. Fertile fronds with fertile pinnae near the middle; no tufts of wool at the base of the pinnae 2. *O. claytoniana*
 - B. Fertile and sterile fronds separate; pinnae of sterile fronds with a tuft of wool in the axils 3. *O. cinnamomea*

1. **OSMUNDA REGALIS** L. var. **SPECTABILIS** (Willd.) Gray (Fig. 10)

ROYAL FERN

Plant with fronds up to 1 m long and 25 cm wide, bipinnate; pinnules oblong to lance-oblong, up to 6 cm long, rounded to the base, sessile, finely toothed; fertile pinnules contracted, borne at the tip of the frond.

It is found in moist habitats throughout the District: swamps, low-lying woods, wet marshy meadows, and even in cedar bogs.



Fig. 10. *Osmunda regalis* var. *spectabilis* (Royal Fern)

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, LANARK, and RUSSELL COUNTIES.

Forma *anomala* (Farw.) Harris has the normally fertile part of the frond intermixed with sterile pinnae and some of the normally sterile pinnae more or less fertile.

It has been collected only once in the District.

ONTARIO: RUSSELL COUNTY.



Osmunda regalis var. *spectabilis*

2. OSMUNDA CLAYTONIANA L. (Fig. 11)

INTERRUPTED FERN

Plant with fronds up to 1.2 m long and 15–25–(30) cm wide, pinnate-pinnatifid; pinnules elliptic-oblong to oblong-oval, blunt, the lower 1.3–1.8 cm long; young pinnae and rachis with a rusty wool, promptly glabrous; 3–5 pairs of dark brown contracted fertile pinnae situated about the middle of the fertile frond.

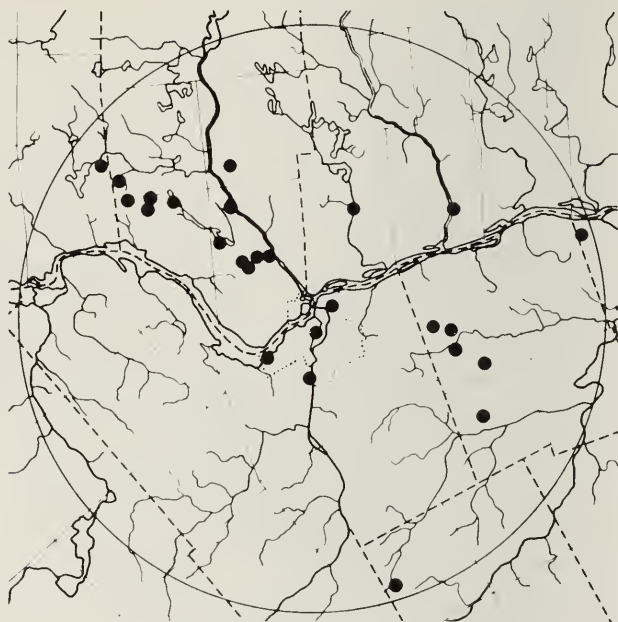
This species is found on moist wooded slopes, at swamp margins, and in open thickets throughout the District.



Fig. 11. *Osmunda claytoniana* (Interrupted Fern)

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, PRESCOTT, and RUSSELL COUNTIES.



Osmunda claytoniana

3. OSMUNDA CINNAMOMEA L. (Figs. 12, 13)

CINNAMON FERN

Plant with sterile fronds 1.2 m long, 15–20–(25) cm wide, similar to *O. claytoniana*, but with a tuft of wool at the base of each pinna; fertile fronds shorter than the sterile, the dark brown pinnae contracted, withering after the spores are cast; immature sterile and fertile fronds covered with a thick rusty wool, which is still partly present on the fertile fronds even at maturity.

It occurs in low ground and in wet marshy woods throughout the District.

QUEBEC: GATINEAU and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, PRESCOTT, and RUSSELL COUNTIES.



Fig. 12. *Osmunda cinnamomea* (Cinnamon Fern—Young Stalks)

Forma *frondosa* (T. & G.) Britt. has the fertile frond partly leafy, the fertile and sterile pinnae variously intermixed.

ONTARIO: RUSSELL COUNTY.



Osmunda cinnamomea



Fig. 13. *Osmunda cinnamomea* (Cinnamon Fern)

POLYPODIACEAE

FERN FAMILY

Perennial leafy plants (ours herbaceous) with creeping rhizomes; sporangia borne on the underside of the usually only slightly modified vegetative fronds, stalked, and partly surrounded by a ring of thickened cells, the annulus, which tears open transversely by contraction at maturity, thus releasing the spores; sporangia usually covered by a protective membrane, the indusium; spores on germination forming thin, green, heart-shaped prothalli.

This is a large family, which some authors treat as several distinct families. Nineteen genera are known to occur in the Ottawa District.

A. Fronds conspicuously dimorphic; fertile ones with divisions greatly contracted or berrylike, brown when fully mature.

B. Sterile fronds bipinnatifid, the veins free *Matteuccia*, p. 35

B. Sterile fronds pinnatifid, the veins netted *Onoclea*, p. 38

A. Fronds not conspicuously dimorphic, all green.

C. Sori marginal.

D. Lower surface of fronds minutely glandular and pubescent; sori minute and dotlike *Dennstaedtia*, p. 77

D. Lower surface of fronds not minutely glandular and pubescent; sori elongate.

E. Stipes stout, 0.2–0.4 cm in diam, commonly solitary *Pteridium*, p. 103

E. Stipes less than 0.2 cm in diam, commonly clustered.

F. Indusia of pinnules continuous.

G. Stipes herbaceous, green *Cryptogramma*, p. 99

G. Stipes wiry, dark brown *Pellaea*, p. 92

F. Indusia definitely interrupted; fronds delicate, branched at the summit *Adiantum*, p. 101

C. Sori dorsal, not marginal (except in *Dryopteris marginalis*).

H. Sori more or less circular, or reniform.

I. Indusium present.

J. Indusium segmented *Woodsia*, p. 40

J. Indusium not segmented.

K. Rachis densely covered with scales; indusium umbrella-shaped, without a notch *Polystichum*, p. 72

K. Rachis lacking or with only a few scales.

- L. Indusium attached by its base on the side toward the midrib, hood-shaped *Cystopteris*, p. 46
- L. Indusium round-reniform, attached in the center.
 - M. Fronds scattered along a thin cordlike rhizome; stipes slender and fragile, naked or with chaffy scales 0.1–0.6 cm long near the base *Thelypteris*, p. 55
 - M. Fronds tufted at the end of a stout rhizome; stipes relatively stout with numerous scales 0.5–3.5 cm long near the base *Dryopteris*, p. 59
- I. Indusium lacking.
 - N. Blades deeply pinnatifid, the divisions confluent at the base *Polypodium*, p. 106
 - N. Blades at least pinnate-pinnatifid.
 - O. Fronds ternate *Gymnocarpium*, p. 50
 - O. Fronds pinnate-pinnatifid *Phegopteris*, p. 53
- H. Sori elongated, oblong to linear, often curved.
 - P. Sori in rows parallel to the midribs of the pinnae and along the midveins of the segments *Woodwardia*, p. 96
 - P. Sori not disposed as above.
 - Q. Blades of fronds simple, long-attenuate at the apex *Camptosorus*, p. 86
 - Q. Blades once to several times divided.
 - R. Sori straight or slightly curved; fronds mostly 10–20 cm long *Asplenium*, p. 88
 - R. Sori often curved over the ends of the veins; fronds mostly 35–90 cm long *Athyrium*, p. 79

MATTEUCCIA

Rhizome ascending, with a crowded crown of large sterile fronds surrounding the upright fertile fronds, which appear later; sori borne on the inside of tube-shaped pinnae; veins free, not forked. One species occurs in the District.

1. MATTEUCCIA STRUTHIOPTERIS (L.) Todaro var. **PEN-
SYLVANICA** (Willd.) Morton (Fig. 14)

Pleretis pensylvanica (Willd.) Fern.

P. nodulosa (Michx.) Nieuwl.

OSTRICH FERN

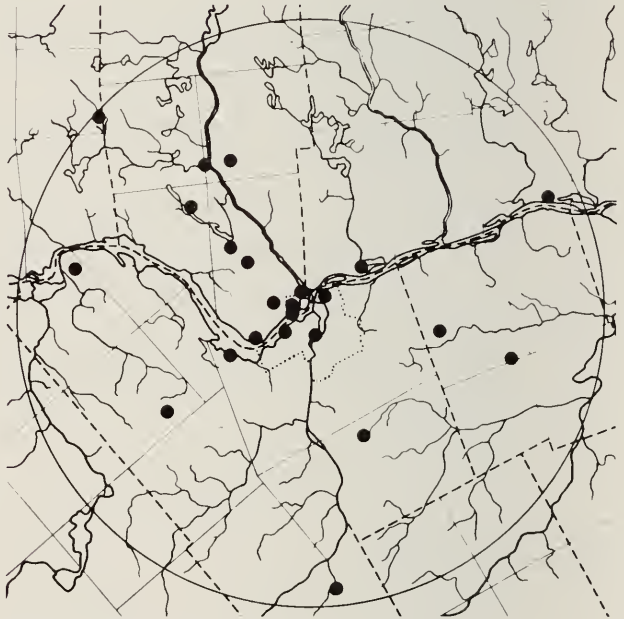
Sterile fronds up to 1.2 m long and 12–24 cm wide, abruptly narrowed at the tip, gradually narrowed to the base, pinnate-pinnatifid, the pinnae broadly linear, acuminate, the pinnules oblong, bluntish; fertile fronds much shorter than the sterile, persistent over winter, the pinnae greenish, becoming dark brown at maturity; sori borne on the margins of the shallowly lobed, tightly inrolled, podlike pinnae.

This fern is very common throughout the District; it is found in damp shady places, especially along streams and roadside ditches.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, GRENVILLE, and RUSSELL COUNTIES.

The young fiddleheads of this fern are used as a vegetable, particularly in the Maritime Provinces. They may be prepared fresh, or preserved by either freezing or canning.



Matteucia struthiopteris var. *pensylvanica*



Fig. 14. *Matteuccia struthiopteris* var. *pennsylvanica* (Ostrich Fern)

ONOCLEA

Fronds of two kinds, borne singly or several together on slender, creeping rootstocks, the fertile hardened; pinnules of the fertile fronds modified and inrolled to form berrylike structures, the sori borne on the inside; veins free on the fertile and netted on the sterile fronds.

This is a monotypic genus.

1. **ONOCLEA SENSIBILIS** L. (Fig. 15)

SENSITIVE FERN

Sterile fronds up to 80 cm high, the blades 12–30 cm long, 15–30 cm wide, broadest at the base, pinnate at the base, pinnatifid above, the rachis winged, the wing becoming broader toward the tip, the pinnae wavy-margined or coarsely toothed; fertile fronds shorter than the sterile, persistent over winter, the pinnules greenish, becoming blackish at maturity; sori borne within the tightly inrolled, berrylike pinnules.

This species is very common throughout the District and is found in low places in woodland, in wet meadows, and in roadside ditches. In the latter habitats it often reaches the proportions of an undesirable weed.



Onoclea sensibilis



Fig. 15. *Onoclea sensibilis* (Sensitive Fern)

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, LANARK, and RUSSELL COUNTIES.

Forma *obtusilobata* (Schkuhr) Gilbert has fronds intermediate between the normal fertile and the normal sterile phases.

It occurs with the typical form and may be the result of damage to young fronds. Several collections have been made in the District.

QUEBEC: GATINEAU COUNTY.

ONTARIO: CARLETON COUNTY.

The sterile fronds of this fern blacken with the frost, hence the name Sensitive Fern.

WOODSIA

Small tufted ferns with free veins, arising from compact rootstocks; indusium of threadlike or platelike segments, attached below, and more or less arched over the round sori. Three species occur in the District.

- | | |
|--|-----------------------|
| A. Stipes jointed at the base | 1. <i>W. ilvensis</i> |
| A. Stipes not jointed. | |
| B. Pinnules broadly rounded; indusium of a few broad segments | 2. <i>W. obtusa</i> |
| B. Pinnules slightly lobed or finely toothed; indusium of narrow and threadlike segments | 3. <i>W. oregana</i> |

1. WOODSIA ILVENSIS (L.) R. Br. (Fig. 16)

RUSTY WOODSIA

Fronds 5–25 cm long, 2–3 cm wide, oblong-lanceolate, pinnate-pinnatifid to bipinnate, the pinnae oblong-lanceolate, the margins of the segments crenate and usually somewhat inrolled; stipes jointed, the old stipe-bases persistent; rachis and under surface of the blade usually brown-chaffy, sori round, numerous and close together on the under surface.



Fig. 16. *Woodsia ilvensis* (Rusty Woodsia)

This species occurs sporadically in shallow soil on steep rocky hill-sides in the Laurentian area. On the Ontario side of the Ottawa River it was formerly known only at Rockcliffe Park where it clings to the rocky cliff above the river, and at Pakenham where the Laurentian Shield just enters the western limit of the District. Extensive stands have, however, recently been discovered on rock exposures near South March.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, and LANARK COUNTIES.



Woodsia ilvensis

2. **WOODSIA OBTUSA** (Spreng.) Torr. (Fig. 17)

BLUNT-LOBED WOODSIA

Fronds 10–30 cm long, 2–10 cm wide, the blades broadly lanceolate, pinnate, the pinnae mostly remote, the lower triangular, the median and upper ovate-lanceolate to oblong, pinnatifid or pinnate at the base, the pinnules oblong, obtuse, crenate-dentate; stipes not jointed; rachis straw-colored, glandular pubescent; sori round, near the margins; indusium covering the sorus, later splitting into several jagged lobes.



Fig. 17. *Woodsia obtusa* (Blunt-lobed Woodsia)

This species is found in the District only near the top of the Gatineau Escarpment southeast of King Mountain and northwest of Champlain Lookout overlooking the Ottawa River, where it is found on a steep rock slope in the open shade of deciduous trees. The only other known localities for this species in Canada are in southwestern Quebec and near Kingston, Ont.

QUEBEC: GATINEAU COUNTY, southwest of King Mountain.



Woodsia obtusa

3. **WOODSIA OREGANA** D. C. Eat. (Fig. 18)

OREGON WOODSIA

Fronds 10–30 cm long, 1.0–3.5 cm wide, the blades linear-lanceolate, the pinnae opposite, remote, triangular-oblong, the pinnules oblong, blunt, the marginal crenulate-serrate teeth often inrolled; stipes not jointed; rachis dark brown at the base, becoming straw-colored above, glabrous or glandular, usually without scales; sori round, medial; indusium of narrow and threadlike segments.

This species is very rare in the District. It is found in a crevice of an igneous rocky exposure in Nepean Township and on a cliff face in Buckingham Township.



Fig. 18. *Woodsia oregana* (Oregon Woodsia)

QUEBEC: GATINEAU COUNTY, north of Val-Paquin.

ONTARIO: CARLETON COUNTY, west of Kanata.



Woodsia oregana

CYSTOPTERIS

Delicate medium-sized ferns with bipinnate to tripinnate fronds arising from short creeping rhizomes; veins free; indusium hood-shaped, thin and withering, attached at one side and arching over the rounded sori. Two species occur in the District.

- A. Fronds lanceolate and usually long-attenuate, often bearing bulblets beneath; veins of pinnules mostly ending in a notch 1. *C. bulbifera*
- A. Fronds lanceolate only, without bulblets; veins of the pinnules mostly ending in a tooth or on the unnotched margin 2. *C. fragilis*

1. CYSTOPTERIS BULBIFERA (L.) Bernh. (Fig. 19)

BULBLET FERN

Fronds 30–60 cm long, the blades 6–15–(18) cm wide near the base,



Fig. 19. *Cystopteris bulbifera* (Bulblet Fern)

lanceolate and long attenuate, the sterile usually shorter, bipinnate, the pinnules oblong, obtuse, pinnatifid to lobed; veins mostly ending in a notch or sinus; dark green bulblets often borne on the underside of the rachis and pinnules.

This a fairly common fern, which is found chiefly on calcareous rocks in shaded ravines and moist woods. In some woods it forms a large part of the ground cover.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON, GRENVILLE, LANARK, and RUSSELL COUNTIES.



Cystopteris bulbifera

2. CYSTOPTERIS FRAGILIS (L.) Bernh. (Fig. 20)

FRAGILE FERN

Fronds 10–35–(40) cm long, the blades 3–8–(10) cm wide near the base, lanceolate, bipinnate, the pinnae pinnatifid to lobed; veins mostly ending in a tooth or on the unnotched margin.

Two varieties are found in the District.

Var. *fragilis*, at least the basal pinnules varying from orbicular to triangular, rounded to the base; indusium up to 1 mm long and more or less cleft at the apex.



Fig. 20. *Cystopteris fragilis* var. *mackayii* (Fragile Fern)

It is found in sheltered crevices in cliffs, moist banks, and wooded talus slopes.

QUEBEC: GATINEAU COUNTY.

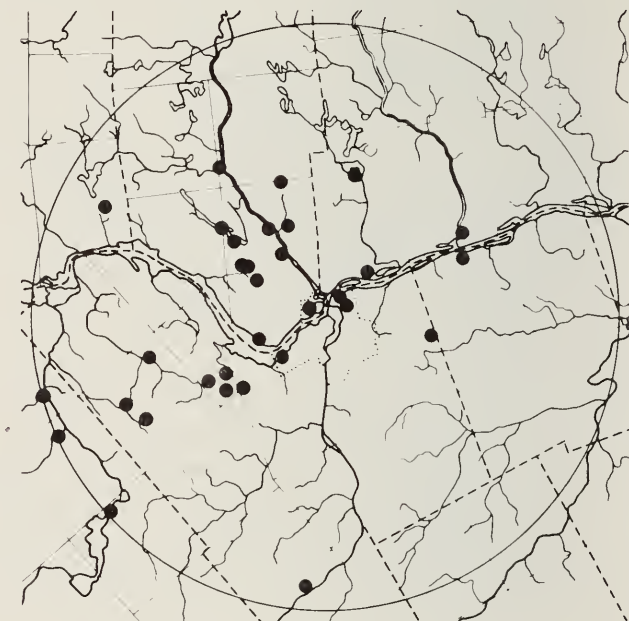
ONTARIO: CARLETON and LANARK COUNTIES.

Var. *mackayii* Lawson (Fig. 20), pinnules oblong to nearly lanceolate, evenly wedge-shaped at the base; indusium about 0.5 mm long and shallowly or not at all toothed at the apex.

This is a fairly common fern, particularly in the Laurentian area, occurring in habitats similar to those of the typical variety.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, LANARK, and RUSSELL COUNTIES.



Cystopteris fragilis incl. var. *mackayii*

GYMNOCARPIUM

Small ferns with delicate, glabrous fronds arising singly from a slender rootstock; sori small, round; indusium absent; veins free, simple or forking. One species occurs in the District.

1. GYMNOCARPIUM DRYOPTERIS (L.) Newm. (Fig. 21)

Dryopteris disjuncta (Ledeb.) C. V. Morton

Thelypteris dryopteris (L.) Slosson

OAK FERN

Fronds 15–30–(35) cm long, arising from a slender rhizome; blades triangular, 8–17–(22) cm wide, 8–17 cm long, ternate, the three divisions pinnate-pinnatifid, the pinnules oblong, blunt; sori small, situated near the margin.

This species is frequent in the District and is found in cool rocky woods, in swamp margins, and on shaded slopes.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, LANARK, and RUSSELL COUNTIES.

Forma *glandulosa* (Tryon) Soper has the rachis and sometimes the pinnules minutely glandular.

It has been collected only once in the District.

ONTARIO: CARLETON COUNTY, Gloucester Twp., Conc. 4, lots 19-20.



Gymnocarpium dryopteris



Fig. 21. *Gymnocarpium dryopteris* (Oak Fern)

PHEGOPTERIS

Small to medium-sized ferns with more or less pubescent fronds arising singly from a slender rootstock; sori small, round; indusium absent; veins free, simple or forking. One species occurs in the District.

1. PHEGOPTERIS CONNECTILIS (Michx.) Watt (Fig. 22)

Phegopteris polypodioides Fée

Dryopteris phegopteris (L.) Christens.

Thelypteris phegopteris (L.) Slosson

LONG BEECH FERN

Fronds 15–35–(42) cm long, arising from a slender rhizome; blades triangular, longer than broad, 8–20 cm long, 6–16 cm wide, tapering to the tip, pinnate-pinnatifid, all but the lower pair connected by a wing, the pinnules oblong, rounded at the tip, more or less hairy on both faces and on the rachis; rachis usually with a brownish chaff; sori small, situated near the margin.



Phegopteris connectilis



Fig. 22. *Phegopteris connectilis* (Long Beech Fern)

This species is fairly frequent in the Laurentian area but rare elsewhere. It is found in woods, wet thickets, and moist rock crevices.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, PRESCOTT, and RUSSELL COUNTIES.

THELYPTERIS

Small to medium-sized ferns with more or less pubescent fronds arising from a slender rootstock; sori small, round; indusium present; veins free, simple or forking. Two species occur in the District.

A. Lower pinnae gradually decreasing in size, the lowest very much decreased 1. *T. noveboracensis*

A. Lower pinnae only slightly if at all smaller; margins of segments rolled back 2. *T. palustris* var. *pubescens*

1. THELYPTERIS NOVEBORACENSIS (L.) Nieuwl. (Fig. 23)

Dryopteris noveboracensis (L.) Gray

NEW YORK FERN

Fronds 25–55 cm long, arising from a slender rhizome; blades elliptic to elliptic-lanceolate, 9–15 cm wide, the lower pinnae very reduced, pinnate-pinnatifid, the pinnae oblong to oblong-lanceolate, somewhat hairy on the rachis and veins, the pinnules oblong; bluntish; sori round, situated near the margin; indusia glandular-ciliate.

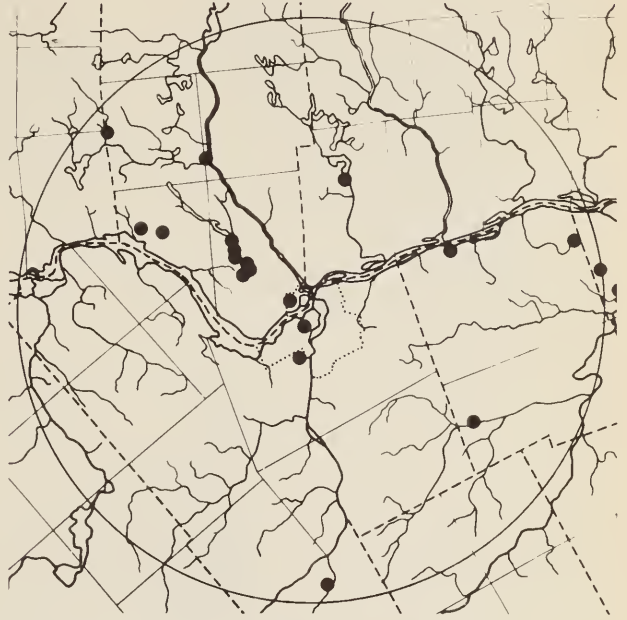
This species is infrequent in the District and most records are from the Gatineau Park and the Gatineau River area. It occurs in moist woods, thickets, and swamps, chiefly in moderately acid soil.



Fig. 23. *Thelypteris noveboracensis* (New York Fern)

QUEBEC: GATINEAU COUNTY; PAPINEAU COUNTY, 3 km south of McGregor Lake.

ONTARIO: CARLETON COUNTY, Ottawa; GRENVILLE and PRESCOTT COUNTIES; RUSSELL COUNTY, Cumberland and 13 km northeast of Clarence Creek.



Thelypteris noveboracensis

2. **THELYPTERIS PALUSTRIS** Schott var. **PUBESCENS** (Lawson) Fern. (Fig. 24)

Dryopteris thelypteris (L.) Gray var. *pubescens* (Lawson) Nakai

MARSH FERN

FronDS 20–60–(70) cm long, arising from an elongate rhizome; blades lanceolate, 7–15 cm wide, pinnate-pinnatifid, the pinnae linear-lanceolate, the pinnules oblong, blunt, dimorphic; fertile fronds usually longer than the sterile with pinnules somewhat thicker and inrolled; rachis and blade minutely pubescent and sometimes glandular; sori round, situated about halfway between the margin and midvein, at maturity partly covered by the inrolled margin.



Fig. 24. *Thelypteris palustris* var. *pubescens* (Marsh Fern)

This fern is fairly frequent and is found in marshes, swamps, wet thickets, bog margins, and ditches throughout the District.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, LANARK, and RUSSELL COUNTIES.



Thelypteris palustris var. *pubescens*

DRYOPTERIS

Large or small ferns with fronds arising in clusters from stout, creeping or erect rootstocks; stipes continuous with the rootstock, not jointed; blades bipinnatifid or pinnate to nearly bipinnate, glabrous or somewhat pubescent; indusium roundish reniform, attached in the center, covering the rounded sori; veins usually free, simple or forked. Four species and one hybrid are recognized for the District.

A. Leaf blades pinnate or if bipinnate, with the segments toothed.

B. Sori marginal 1. *D. marginalis*

B. Sori not marginal.

C. Leaf blades tending to be short and broad, oval-triangular in outline; basal scales firm, deep brown

..... 2. *D. goldiana*

C. Leaf blades narrowly oval in outline; basal scales thin, membranous, light brown.

D. Indusia glandular

5. *D. ×boottii*

D. Indusia not glandular

3. *D. cristata*
var. *cristata*

A. Leaf blades tripinnate or if bipinnate, with the segments pin-
natifid

4. *D. spinulosa*
var. *spinulosa*

1. *DRYOPTERIS MARGINALIS* (L.) Gray (Fig. 25)

Thelypteris marginalis (L.) Nieuwl.

MARGINAL SHIELD FERN

Fronds 25–60–(70) cm long, crowded to form a crown on the stout ascending rhizome, the lower part of the stipe covered with thin, light brown, lance-linear scales; blades 9–20–(25) cm wide, dark green above, gray green below, leathery, lanceolate to oblong-ovate, bipinnate, the pinnae lanceolate, the pinnules oblong, entire to deeply lobed; sori situated near the margin; indusia whitish, becoming light brown at maturity.



Dryopteris marginalis



Fig. 25. *Dryopteris marginalis* (Marginal Shield Fern)

This species is very common in the Laurentian area but is found throughout most of the District where the habitat is suitable. It occurs on shaded ledges and in rocky woods.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, GRENVILLE, LANARK, RUSSELL, and STORMONT COUNTIES.

2. *DRYOPTERIS GOLDIANA* (Hook.) Gray (Fig. 26)

Thelypteris goldiana (Hook.) Nieuwl.

GOLDIE'S FERN

Fronds 50–100 cm long, crowded at the top of the stout ascending rhizome, the lower part of the stipe covered with dark brown to blackish lance-acuminate scales; blades ovate-lanceolate, 20–40 cm broad, pinnate-pinnatifid, the pinnae broadly oblong-lanceolate, the pinnules linear-oblong, usually crenulate or serrated on the margins; sori round, situated near the midrib.



Dryopteris goldiana



Fig. 26. *Dryopteris goldiana* (Goldie's Fern)

This species is rare in the District and occurs on shaded rocky slopes and in cool moist woods. For many years it was known from only three localities: Ottawa (Fletcher 1880); Beechwood in Ottawa (Fletcher 1882); and Chelsea (Macoun 1903). Intensive collecting, particularly by members of the Fern Group of the Ottawa Field-Naturalists' Club, has shown that it is still present at Beechwood, and has revealed several stands in the Chelsea area. Additional locations have been found at Pakenham in Lanark County, and near South March in Carleton County.

QUEBEC: GATINEAU COUNTY.

ONTARIO: CARLETON and LANARK COUNTIES.

3. **DRYOPTERIS CRISTATA** (L.) Gray var. **CRISTATA** (Fig. 27)

Thelypteris cristata (L.) Nieuwl.

CRESTED WOOD FERN

Fronds 25–90 cm long, forming a crown at the top of the stout ascending rhizome, the fertile longer than the sterile; stipes with pale brown ovate-lanceolate scales; blades linear-oblong to narrowly lance-oblong, 6–15 cm wide, pinnate-pinnatifid, the basal pinnae short triangular; pinnae of fertile fronds turned at right angles to the rachis; pinnules oblong, obtuse, serrate; sori round, situated midway between the margin and midvein.

This variety is infrequent to rare in the District and occurs in marshes and swamps and on springy wooded slopes.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON and GRENVILLE COUNTIES.

Var. *clintoniana* (D. C. Eat.) Underw. (*Thelypteris cristata* (L.) Nieuwl. var. *clintoniana* (D. C. Eat.) Weath.), blades lance-oblong, 11–20 cm wide, the basal pinnae little reduced; fertile pinnae in the same plane as the rachis.



Fig. 27. *Dryopteris cristata* var. *cristata* (Crested Wood Fern)

Less frequent than the typical variety, this variety occurs in swamps, wet woods, and thickets on stream banks.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON, GRENVILLE, and LANARK COUNTIES.



Dryopteris cristata incl. var. *clintoniana*

4. **DRYOPTERIS SPINULOSA** (O. F. Muell.) Watt var. **SPINULOSA** (Fig. 28, 29)

Thelypteris spinulosa (O. F. Muell.) Nieuwl.

SPINULOSE WOOD FERN, FLORIST'S FERN

Fronds 30–80 cm long, forming a crown at the top of a stout ascending rhizome; stipes with ovate brown scales, particularly near the base; blades lanceolate, 10–20 cm wide, bipinnate or bipinnate-pinnatifid, the pinnules oblong, with spine-tipped teeth; blade and rachis not glandular; inner lower pinnule of basal pinnae usually longer than the next one to it; sori round; indusia not glandular.

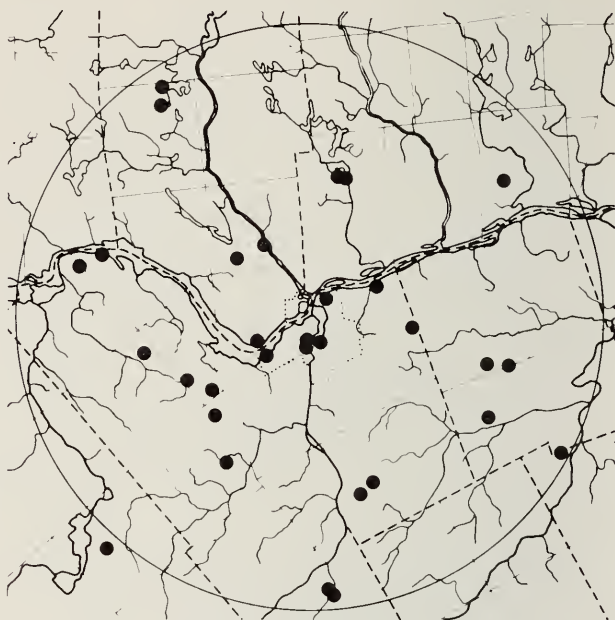
This variety is found throughout most of the District and occurs in swamps, wet woods, springy banks, and on moist rocky slopes.



Fig. 28. *Dryopteris spinulosa* var. *spinulosa* (Spinulose Wood Fern, Florist's Fern)

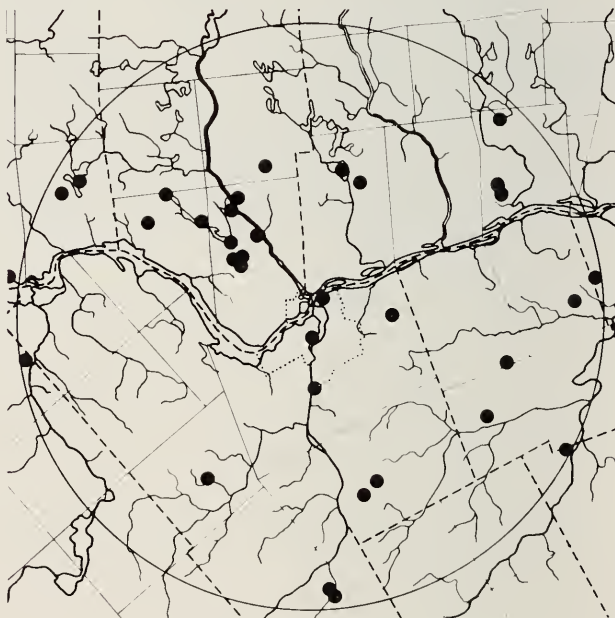
QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON, GRENVILLE, LANARK, RUSSELL, and STORMONT COUNTIES.



Dryopteris spinulosa var. *spinulosa*

Var. *intermedia* (Muhl.) Underw. (Fig. 29), rachis and blade usually glandular; blades bipinnate-pinnatifid; inner lower pinnule of basal pinnae usually shorter than the next one to it; indusia glandular.



Dryopteris spinulosa var. *intermedia*



Fig. 29. *Dryopteris spinulosa* var. *intermedia* (Spinulose Wood Fern, Florist's Fern)

This variety is fairly common in the District, particularly in the Laurentian area, and is found in rich woods and on shaded rocky slopes.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, GRENVILLE, LANARK, PRESCOTT, RUSSELL, and STORMONT COUNTIES.

Occasional specimens with large glandular indusia and pinnae approaching the shape of var. *spinulosa* have been called var. *fructuosa* (Gilbert) Trudell. They are reputed to be hybrids between var. *spinulosa* and var. *intermedia*.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON, LANARK, and RUSSELL COUNTIES.



Dryopteris spinulosa var. *fructuosa*

5. DRYOPTERIS × BOOTTII (Tuckerm.) Underw. (Fig. 30)

BOOTT'S WOOD FERN

A hybrid between *D. spinulosa* var. *intermedia* and *D. cristata*; blades narrower and less divided than those of *D. spinulosa* var. *intermedia*,



Fig. 30. *Dryopteris Xboottii* (Boott's Wood Fern)

thus approaching *D. cristata*; pinnules retaining the spinulose teeth of var. *intermedia*, but the teeth much less conspicuous than those of that parent; indusia glandular.

This fern has been collected only six times in the District. It may, however, be expected anywhere that the ranges of the parent species coincide.

QUEBEC: GATINEAU COUNTY, Wakefield and near Wilson's Corners.

ONTARIO: CARLETON COUNTY, Dow's Swamp and White's Bridge, Ottawa; GRENVILLE COUNTY, Kemptville; LANARK COUNTY.



Dryopteris Xbootii

POLYSTICHUM

Rather large, tufted, evergreen, leathery-textured ferns with scaly stipes arising from short stout rhizomes; sori round, covered by round indusia, which are attached at the center. Two species occur in the District.

- A. Fronds simply pinnate 1. *P. acrostichoides*
- A. Fronds bipinnate 2. *P. braunii* var. *purshii*

1. POLYSTICHUM ACROSTICHOIDES (Michx.) Schott
(Fig. 31)

CHRISTMAS FERN

Fronds 35–65 cm long; stipes and rachis chaffy; blades lanceolate, 7–12–(16) cm wide, simply pinnate, the pinnae oblong to lanceolate, acute or sometimes bluntish at the tip, auricled at the base on the upper side, the margins serrulate-bristly; sori borne on reduced upper pinnae, distinct or more often confluent.

This species is fairly frequent in the Laurentian region but rare elsewhere. Most of the specimens seen were collected in the Gatineau River valley and in Gatineau Park. It is found in humus-rich crevices in rocks and open thickets.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, LANARK, RUSSELL, and STORMONT COUNTIES.

Forma *incisum* (Gray) Gilbert, pinnae coarsely toothed; fertile pinnae less reduced, the sori usually less confluent, some sori often found at the tips of the unreduced pinnae.

It is found throughout the range of the species but has been collected only twice in the District.

QUEBEC: GATINEAU COUNTY.



Polystichum acrostichoides



Fig. 31. *Polystichum acrostichoides* (Christmas Fern)

2. POLYSTICHUM BRAUNII (Spenner) Fée var. **PURSHII**
Fern. (Fig. 32)

EASTERN HOLLY FERN

Fronds 30–50 cm long; stipes, rachis, and under surface of pinnules chaffy; blades elliptic-lanceolate, 8–12 cm wide, tapering at both ends, bipinnate, the lower pinnae oblong, the median pinnae oblong to lanceolate; pinnules with incurved bristle-tipped teeth, blunt, oblong to ovate with a small auricle on the upper side at the base; sori distinct, situated near the midrib.

This fern is very rare, and is known only from the Burnet – Chelsea – Old Chelsea – Kingsmere area, where it is found in deep woods in sheltered ravines. Until recently this plant was thought to be extinct in the District. It was first discovered by James Fletcher in 1891, and until it was rediscovered in 1952 by a member of the Fern Group of the Ottawa Field-Naturalists' Club, it had not been seen since John Macoun collected it in 1911. The most recent discovery was described in *Trail and Landscape* 4(5):152–153. 1970.

QUEBEC: GATINEAU COUNTY, between Old Chelsea and Kingsmere.



Polystichum braunii var. *purshii*



Fig. 32. *Polystichum braunii* var. *purshii* (Eastern Holly Fern)

DENNSTAEDTIA

Fairly large ferns with fronds clustered or in colonies arising from slender creeping rootstocks; rachis and under surface of the fronds minutely glandular-pubescent; sori round, covered by cup-shaped indusia. One species occurs in the District.

1. **DENNSTAEDTIA PUNCTILOBULA** (Michx.) Moore (Fig. 33)

HAY-SCENTED FERN

Fronds 30–75 cm long; stipes pale brown, lustrous, naked; blades lanceolate, bipinnate, the pinnae lanceolate, the pinnules pinnatifid with toothed lobes; sori minute, situated on the upper margin of the lobes.



Dennstaedtia punctilobula



Fig. 33. *Dennstaedtia punctilobula* (Hay-scented Fern)

This species is seemingly rare, but perhaps it is overlooked. It was previously known in the District only from the southern hills of Gati-neau Park, Wakefield, Ottawa, Russell, and Casselman but was recently discovered a number of times in sandy terrain east of Ottawa and near Bell's Corners. It occurs in dry open woods, rocky slopes, and particularly in sterile pastures.

QUEBEC: GATINEAU COUNTY.

ONTARIO: CARLETON, PRESCOTT, and RUSSELL COUNTIES.

ATHYRIUM

Rather large ferns with large rootstocks; veins either simple or somewhat forked; sori curved or straight, borne along the veins; indusium attached on one side of the sorus. Three species are found in the District.

A. Fronds pinnate or bipinnatifid.

B. Fronds pinnate ... 1. *A. pycnocarpon*

B. Fronds deeply bipinnatifid ... 2. *A. thelypteroides*

A. Fronds bipinnate to tripinnatifid ... 3. *A. filix-femina* var. *michauxii*

1. ATHYRIUM PYCNOCARPON (Spreng.) Tidestr. (Fig. 34)

NARROW-LEAVED SPLEENWORT

Fronds 60–125 cm long, forming a crown at the end of a stout horizontal rhizome; sterile blades lanceolate, 8–16 cm wide, simply pinnate, the pinnae long-acuminate, rounded to truncate at the base, membranous; sori linear, situated on the veins in crowded rows between the midrib and the margin; indusium opening along one side. The species has been collected in the immediate vicinity of Ottawa, but not since 1903. In 1952 it was rediscovered by members of the Fern Group of The Ottawa Field-Naturalists' Club near Chelsea, where



Fig. 34. *Athyrium pycnocarpon* (Narrow-leaved Spleenwort)

it had remained hidden since 1911. Three new sites have been found recently on the Ontario side of the Ottawa River and several in the Gatineau area. The Rideau Park location has probably been obliterated by the advances of the city of Ottawa, but it may still be possible to relocate the Beechwood stand. This fern is found in deep rich woods and moist ravines.

QUEBEC: GATINEAU COUNTY, between Old Chelsea and Kingsmere.

ONTARIO: CARLETON COUNTY, in Rideau Park and near Beechwood Cemetery in Ottawa.



Athyrium pycnocarpon

2. ATHYRIUM THELYPTERIOIDES (Michx.) Desv. (Fig. 35) **SILVERY SPLEENWORT**

Fronde 45–80 cm long, forming a crown at the end of the horizontal rhizome; blades lanceolate to elliptic-lanceolate, 8–22 cm wide, pinnate-pinnatifid, the pinnae long-tapering, its segments oblong, blunt, finely toothed; sori straight or slightly curved, situated on the veins between the midrib and margin; indusia becoming silvery at maturity, opening on one side, or if double, opening on both sides.



Fig. 35. *Athyrium thelypteroides* (Silvery Spleenwort)

Infrequent to rare, this species occurs in rich woods, on stream banks, on shaded slopes, and rarely in open thickets.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON COUNTY, Rideau Park, Ottawa; GRENVILLE, LANARK, and PRESCOTT COUNTIES; RUSSELL COUNTY, Casselman.



Athyrium thelypteroides

3. **ATHYRIUM FILIX-FEMINA** (L.) Roth var. **MICHAUXII** (Spreng.) Farw. (Fig. 36)

A. angustum (Willd.) Presl

LADY FERN

Fronds 30–100–(110) cm long, forming a crown on the stout, ascending rhizome; blades lanceolate, 12–24–(28) cm wide, bipinnate to tripinnatifid, the pinnae lanceolate, the pinnules somewhat lobed to deeply toothed, blunt, or acute at the tip.

This is an extremely variable fern. On the basis of differences in the frond the following forms might be recognized, but in all cases they gradate from one to the other:

Forma *michauxii*, fronds dimorphic, the fertile contracted; pinnae 5–12 cm long; pinnules 7–12 mm long, rounded and only shallowly lobed; sori usually becoming confluent at maturity.

Forma *elatus* (Link) Clute, fronds dimorphic, the fertile contracted; pinnae 10–20 cm long; pinnules 12–25 mm long, pinnatifid, acutish; lower sori often strongly curved or horseshoe-shaped; sori usually becoming confluent at maturity.

Forma *rubellum* (Gilbert) Farw., fronds not dimorphic, larger than the two preceding forms; pinnules strongly toothed or pinnatifid; sori separate at maturity.

The lady fern is of very frequent occurrence in the District. It is found in many habitats, from meadows to open thickets, moist woods, and even swamps.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, LANARK, and RUSSELL COUNTIES.



Athyrium filix-femina var. *michauxii* forms



Fig. 36. *Athyrium filix-femina* var. *michauxii* (Lady Fern)

CAMPTOSORUS

Slender plants with erect or ascending scaly rootstocks; veins reticulate; sori elongate; indusium attached on one side of the sorus. One species is found in the District.

1. CAMPTOSORUS RHIZOPHYLLUS (L.) Link (Fig. 37)

WALKING FERN

Fronds 5–30–(35) cm long, approximately clustered at the end of the rhizome; blades evergreen, entire, 1–3 cm wide at the cordate or auriculate base, usually tapering to a long caudate tip; sori elongate, scattered along the veins; tips of the arching blades often rooting to form new plants, hence the name, Walking Fern.

This species is rare in the District because of its habitat restrictions, but recent observations have shown that it is quite frequent in the Pink Lake region of southern Gatineau Park. A review of recent



Camptosorus rhizophyllus



Fig. 37. *Camptosorus rhizophyllus* (Walking Fern)

collections in the District is presented in Trail and Landscape 8(4): 114–115. 1974. It is found in sheltered places on damp, often mossy rocks and stony banks, preferring limestone.

QUEBEC: GATINEAU COUNTY, Old Chelsea and near King Mountain; PAPINEAU COUNTY.

ONTARIO: CARLETON COUNTY, Beechwood (Ottawa), Corkery, Constance Lake, and Fallowfield; LANARK COUNTY.

ASPLENIUM

Small plants from small compact rootstocks; veins free; sori linear and straight; indusium attached along one side of the sorus. Two species are found in the District.

- A. Sterile and fertile fronds similar; pinnae ovate
..... 1. *A. trichomanes*
- A. Sterile and fertile fronds different; pinnae linear-oblong to
triangular 2. *A. platyneuron*

1. ASPLENIUM TRICHOMANES L. (Fig. 38)

MAIDENHAIR SPLEENWORT

Fronds 6–20–(27) cm long, forming a dense tuft from a compact rhizome; stipes and rachises purple brown, the old rachises persistent; blades linear, pinnate, the pinnae usually opposite or subopposite, oval, rounded to cuneate at the inequilateral base, slightly toothed on the sides and at the blunt apex; sori linear, situated on the veins between the midrib and margin.

This is a rather rare fern in the District. Most of our collections are from the Laurentian region, particularly from the southern part of Gatineau Park. Recent collections on rock exposures near South

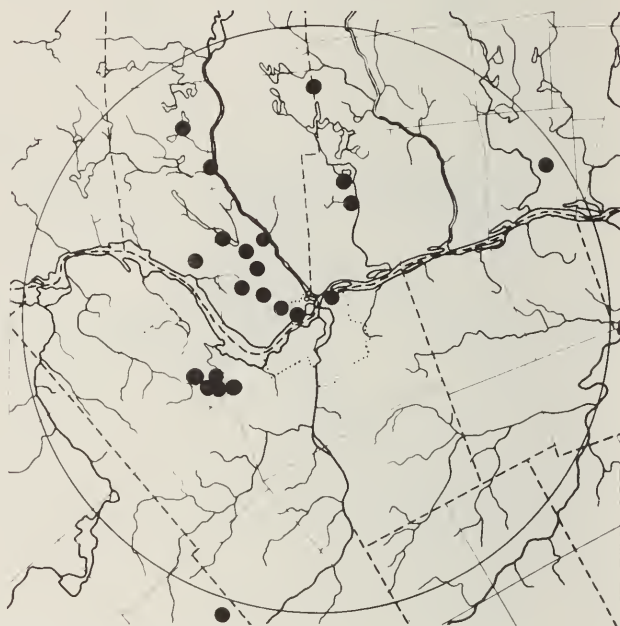


Fig. 38. *Asplenium trichomanes* (Maidenhair Spleenwort)

March indicate that additional sites may still be found in similar situations on the Ontario side of the Ottawa River. It is found in moist sheltered crevices in rocky places.

QUEBEC: GATINEAU and PAPINEAU COUNTIES.

ONTARIO: CARLETON COUNTY, Rockcliffe Park, South March;
LANARK COUNTY.



Asplenium trichomanes

2. ASPLENIUM PLATYNEURON (L.) Oakes (Fig. 39)

EBONY SPLEENWORT

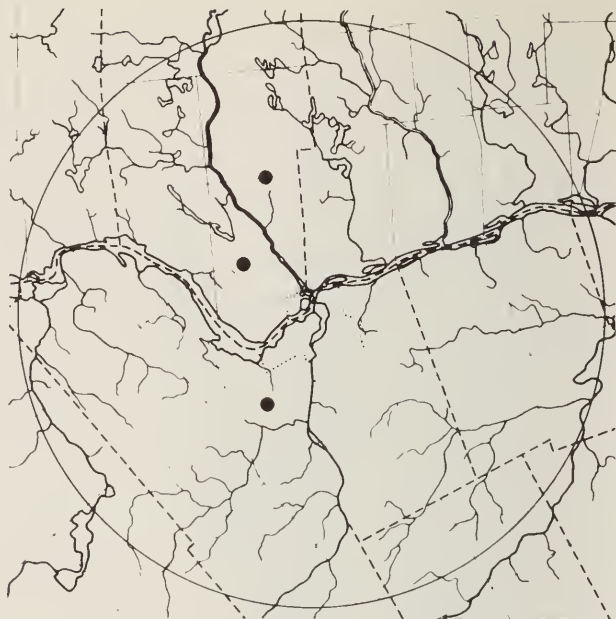
Fronds tufted from a short rootstock, the fertile stiff and upright, 20–40 cm long, 2.5–4.0 cm wide, gradually tapering to the base, the pinnae linear-oblong or the basal triangular, auricled, widely separated and alternate; rachis lustrous, chestnut purple; sterile fronds shorter, spreading and prostrate, with oblong approximate pinnae; sori linear-oblong, situated on the veins, nearer the midvein than the margin.

This is a very rare fern in the District. It has been found in moss and in very shallow soil on almost buried rocks in cleared and grown-over areas or in partial shade.



Fig. 39. *Asplenium platyneuron* (Ebony Spleenwort)

QUEBEC: GATINEAU COUNTY, Wilson's Corners and near Pink Lake.
ONTARIO: CARLETON COUNTY, south of Bell's Corners.



Asplenium platyneuron

PELLAEA

Small tufted plants from compact rootstocks; veins free; sori marginal and confluent under the inrolled and altered margin of the fertile pinnules. Two species are found in the District.

- | | |
|--|---------------------------|
| A. Rachis dark purple-brown, dull, pubescent with more or less appressed hairs | 1. <i>P. atropurpurea</i> |
| A. Rachis dark reddish-brown, smooth, lustrous | 2. <i>P. glabella</i> |

1. PELLAEA ATROPURPUREA (L.) Link (Fig. 40)

PURPLE CLIFF-BRAKE

Fronds dimorphic, the fertile 10–35 cm long, longer than the sterile, 3.5–8 cm wide; stipes and rachis dark purple-brown, dull, pubescent



Fig. 40. *Pellaea atropurpurea* (Purple Cliff-Brake)

with more or less appressed hairs; pinnae rigid, evergreen, bluish-green, simple above, bipinnate below, the fertile, linear to oblong or narrowly ovate, and the lower pinnules stalked; the sterile ovate-oblong; sori situated around the margins of the fertile pinnules, the inrolled margin forming the indusium.

This fern is restricted to ledges and rubble below marble cliff faces of the Gatineau Escarpment overlooking the Ottawa River valley, and in the Rivière Blanche drainage.

QUEBEC: GATINEAU COUNTY, near King Mountain and north of Val-Paquin.



Pellaea atropurpurea

2. PELLAEA GLABELLA Mett. (Fig. 41)

SMOOTH CLIFF-BRAKE

Fronds similar, usually shorter than *P. atropurpurea*; stipes and rachis dark reddish-brown, smooth and lustrous; pinnae rigid, evergreen, bluish-green, simple above, pinnate below, the pinnules sessile or nearly so, oblong-lanceolate; sori situated around the margins of the fertile pinnules, the inrolled margin forming the indusium.

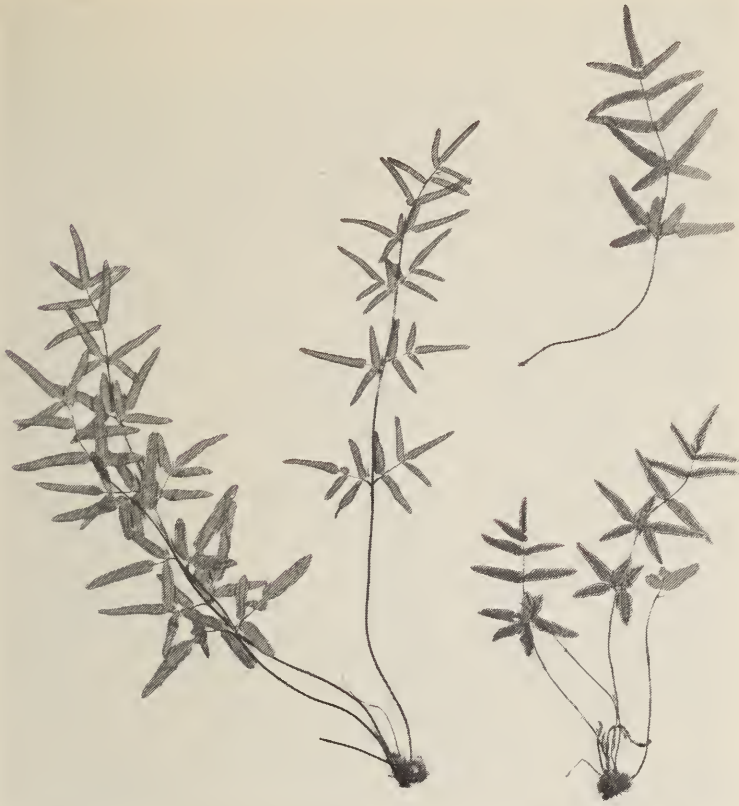


Fig. 41. *Pellaea glabella* (Smooth Cliff-Brake)

This species is rare in the District and is known only from one cliff face where it grows in tufts from crevices.

QUEBEC: PAPINEAU COUNTY, east of Poltimore.



Pellaea glabella

WOODWARDIA

Coarse ferns from horizontal or creeping rootstocks; veins united to form a single series of areolae next to the midrib of both the pinnae and the pinnules, elsewhere free; sori elongate, borne along the veins, which form the outer side of the areolae; indusium persistent, opening on the side away from the midrib. One species occurs in the District.

1. **WOODWARDIA VIRGINICA** (L.) Sm. (Fig. 42)

VIRGINIAN CHAIN FERN

Fronds 60–100 cm long, scattered along the creeping rhizome; blades oblong-lanceolate, 10–30 cm wide, pinnate-pinnatifid, the pinnae



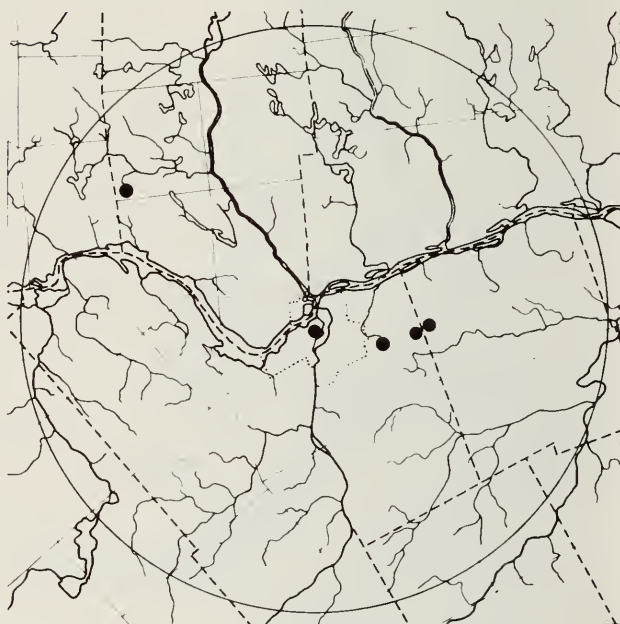
Fig. 42. *Woodwardia virginica* (Virginian Chain Fern)

linear-lanceolate, the pinnules oblong, obtuse, with finely serrulate margins; sori oblong, one to each areole, usually becoming confluent at maturity.

Until recently this interesting fern was known only from the Mer Bleu, peat bog, southeast of Ottawa, where it is of quite common occurrence. In 1894 John Macoun collected this species "in the swamp at the race course west of Bank St. Road, Ottawa." This area, which is in that part of Ottawa known as the Glebe, is completely built over and the habitat has been obliterated. In 1959 the species was found in a small bog in Pontiac County.

QUEBEC: PONTIAC COUNTY, north of Ramsay Lake.

ONTARIO: CARLETON and RUSSELL COUNTIES.



Woodwardia virginica

CRYPTOGRAMMA

Small ferns from slender creeping rootstocks; veins free; sori marginal, covered by a continuous indusium formed by the reflexed margin. One species is found in the District.

1. **CRYPTOGRAMMA STELLERI** (Gmel.) Prantl (Fig. 43)

SLENDER CLIFF-BRAKE

Fronds dimorphic, scattered along the horizontal rhizome; sterile fronds almost flaccid, 3–10 cm long, the blades ovate to ovate-deltoid, bipinnate, the pinnules oblong, ovate or obovate flabelliform; fertile fronds stiffer, 9–21 cm long, the pinnules lanceolate to oblong; sori situated around the margins of the fertile pinnules, the inrolled margin forming the indusium.

This species is rare and restricted in distribution because of its special habitat requirements, but is more frequent than indicated in 1956. It occurs in moist shaded crevices of cliff faces.

QUEBEC: GATINEAU COUNTY, west of King Mountain; PAPINEAU COUNTY, north of Lac la Blanche.

ONTARIO: CARLETON COUNTY, Rockcliffe Park, March.



Cryptogramma stelleri



Fig. 43. *Cryptogramma stelleri* (Slender Cliff Brake)

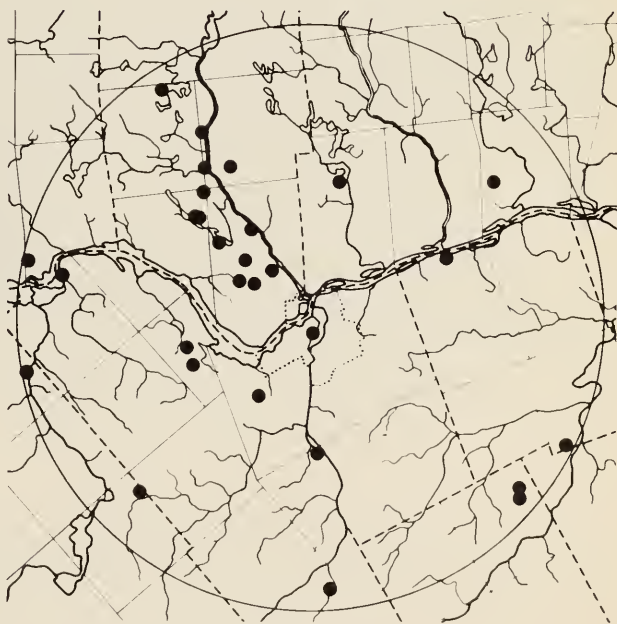
ADIANTUM

Delicate ferns from creeping rootstocks; veins free-forking; sori oblong, borne along the upper margin of the pinnules, each covered by an indusium, which arises from the inrolled margin. One species is found in the District.

1. **ADIANTUM PEDATUM** L. var. **PEDATUM** (Fig. 44)

MAIDENHAIR FERN

Fronds 30–55 cm long, in colonies arising from horizontal rhizomes; stipes lustrous purple-brown, forking at the summit into two arching rachises, each of which divides several times into spreading divisions, thus forming a circular or semicircular blade 15–35 cm wide; pinnules short-stalked, obliquely triangular oblong, the terminal one fan-shaped; main vein along the lower entire margin, the upper margin cleft, the lobes thus formed, blunt; sori elongate, borne on the upper margins of the lobes of the pinnules; indusium formed by the inrolled margin.



Adiantum pedatum incl. var. *aleuticum*



Fig. 44. *Adiantum pedatum* var. *pedatum* (Maidenhair Fern)

This peculiar fern is of quite frequent occurrence in the Laurentian area, where it is found on wooded, sometimes rocky, slopes in humus-rich soil. It is not common elsewhere in the District.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, LANARK, and RUSSELL COUNTIES.

Var. *aleuticum* Rupr., branches of the stipe straight or only slightly reflexed; pinnae strongly ascending.

Two specimens that seem to belong to this variety have been collected in the Laurentian region.

QUEBEC: GATINEAU COUNTY, Hull Twp., Gatineau Park, Lake Trail;
PAPINEAU COUNTY, Templeton Twp., McGregor Lake.

PTERIDIUM

Coarse plants from creeping rootstocks; veins forking, ending in a veinlike receptacle, from which the indusium arises; sori marginal, continuous. One species occurs in the District.

1. **PTERIDIUM AQUILINUM** (L.) Kuhn var. **LATIUSCULUM** (Desv.) Underw. (Fig. 45)

P. latiusculum (Desv.) Hieron.

BRACKEN

Fronds 30–70 cm or more long, in extensive colonies from creeping and forking underground rhizomes; blades triangular, usually ternate, 30–50 cm wide, bipinnate-pinnatifid to tripinnate-pinnatifid, the lower pinnules more or less pinnatifid, the upper entire; margin of the pinnules inrolled to form a secondary indusium over the continuous marginal sori.

This is probably the most common of all our ferns. It occurs as a weed in pastures, on grassy slopes in abandoned fields, in burnt-over areas, in damp or more often dry, usually sterile soil, as well as on open slopes, and in open woods and thickets.



Fig. 45. *Pteridium aquilinum* var. *latiusculum* (Bracken)

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, DUNDAS, GRENVILLE, LANARK, and RUSSELL COUNTIES.

In early spring the young fronds of *Pteridium* have been highly valued as a green vegetable, particularly in New Zealand and Japan. Recent studies have shown that this species is carcinogenic in rats, is responsible for enzootic bovine haematuria in cattle, and causes vitamin B₁ avitaminosis in horses and other nonruminants (Can. J. Plant Sci. 55:1059-1072. 1975). It is therefore not recommended for human consumption.



Pteridium aquilinum var. *latiusculum*

● specimens/○ field observations

POLYPODIUM

Small ferns from slender, branched, creeping rootstocks; veins free; sori round; indusium absent. One species occurs in the District.

1. **POLYPODIUM VIRGINIANUM** L. (Fig. 46)

COMMON POLYPODY

Fronds 10–30–(35) cm long, scattered along the creeping, scaly rhizome; blades evergreen, oblong-lanceolate, 3–6–(8) cm wide, deeply pinnatifid, the segments linear-oblong, entire to remotely dentate, blunt or acutish; sori large, orbicular, naked, borne midway between the midvein and margin.

This is a fairly common fern in the Laurentian region. It is found less frequently on the few rocky outcrops south of the Ottawa River and is almost unknown in the lowland area. It occurs in shallow humus on rocks, in crevices, and sometimes on woodland banks. Very rarely it is found on mossy stumps and in crotches of trees.

QUEBEC: GATINEAU, PAPINEAU, and PONTIAC COUNTIES.

ONTARIO: CARLETON, LANARK, and RUSSELL COUNTIES.



Polypodium virginianum



Fig. 46. *Polypodium virginianum* (Common Polypody)

GLOSSARY

- acuminate** Tapering at the end to a gradual point.
- areole** A small space marked out upon or beneath a surface.
- attenuate** Slenderly tapering.
- auricle** An ear-shaped appendage or lobe.
- bipinnate** Doubly or twice pinnate.
- blade** The expanded part of a frond.
- caudate** Having a slender tail-like appendage.
- ciliate** Marginally fringed with hairs.
- confluent** Running together.
- cordate** Heart-shaped.
- coriaceous** Leathery in texture.
- crenate** Dentate with teeth much rounded.
- cuneate** Wedge-shaped.
- deltoid** Shaped like the Greek letter Δ.
- dichotomous** Forking regularly in pairs.
- dimorphic** Having two forms.
- fertile** Capable of producing fruit.
- flabelliform** Fan-shaped or broadly wedge-shaped.
- flaccid** Without rigidity.
- frond** The leaf of a fern, including stipe, rachis, and pinnae.
- gametophyte** In the life cycle, the generation in which sexual organs are produced.
- glabrous** Smooth, without hairs.
- glandular** Bearing glands.
- globose** Spherical.
- herbaceous** Having the characters of an herb; leaflike in color and texture.
- imbricated** Overlapping.
- indusium** The covering of the sorus.
- lanceolate** Shaped like a lance head, several times longer than wide, broadest toward the base and narrowed to the apex.
- linear** Long and narrow, with parallel margins.
- oblanceolate** Lanceolate with the broadest part toward the apex.
- oblong** Two to three times longer than broad and with nearly parallel sides.
- obtuse** Blunt or rounded at the end.
- orbicular** Circular.
- ovate** Egg-shaped; having an outline like that of an egg, with the broader end basal.

- palmate** Radiately lobed or divided.
- pinna** One of the primary divisions of a pinnate or pinnately compound frond.
- pinnate** Compound, with the leaflets arranged on each side of a common axis.
- pinnatifid** Pinnately cleft.
- pinnule** A secondary pinna.
- prothallus** A cellular, usually -flat, thalluslike growth, resulting from the germination of a spore, upon which are developed sexual organs or new plants.
- pubescent** Covered with hairs.
- rachis** The upper part of the petiole, bearing the pinnae and continuous with the stipe.
- reflexed** Bent abruptly downward.
- reniform** Kidney-shaped.
- reticulate** In the form of a network.
- rhizome** The rootstock or underground stem.
- serrate** Having sharp teeth pointing forward.
- serrulate** Finely serrate.
- sessile** Without stalk of any kind.
- sorus** A heap or cluster of sporangia bearing the spores.
- sporangium** The globular organ in which the spores are produced.
- spore** An asexual reproductive cell that germinates into a prothallus, which in turn gives rise to the sexual reproduction.
- sporophyte** In the life cycle, the generation in which spores are produced.
- stipe** The lower part of the petiole, not bearing pinnae.
- ternate** In threes.
- tripinnate** Three times pinnate.
- truncate** Ending abruptly.

INDEX

(Synonyms are in *italics*. Principal references are in bold face.)

- Adder's-tongue 24
- Adder's-tongue family 7
- Adiantum 34, **101**
 - pedatum var. pedatum **101**
 - pedatum var. aleuticum **103**
- Asplenium 35, **88**
 - phatyneuron 4, 88, **90**
 - trichomanes **88**
- Athyrium 35, **79**
 - angustum* 83
 - filix-femina 5
 - filix-femina
 - var. michauxii 79, **83**
 - f. elatius **84**
 - f. michauxii **84**
 - f. rubellum **84**
 - pycnocarpon 5, 6, **79**
 - thelypteroides 79, **81**
- Boott's wood fern 70
- Botrychium 7, **8**
 - dissectum 8, **12**
 - dissectum var. dissectum **12**
 - dissectum var. obliquum **14**
 - f. *obliquum* 14
 - dissectum var. oneidense **14**
 - f. *oneidense* 14
 - lanceolatum
 - var. angustisegmentum 6, 8, **20**
 - lunaria* 16
 - matricariaefolium
 - var. matricariaefolium 8, **18**
 - multifidum 8, **10**, 12
 - multifidum var. intermedium **10**
 - multifidum var. multifidum **10**
 - obliquum 14
 - silatifolium* 10
 - simplex 16
 - simplex var. simplex 16
 - simplex var. tenebrosum 5, 8, **16**
 - virginianum
 - var. virginianum 5, 8, **22**
- Bracken 103
- Bulblet fern 46
- Camptosorus 35, **86**
 - rhizophyllus 5, **86**
- Christmas fern 73
- Cinnamon fern 30
- Cliff-brake
 - Purple 92
 - Slender 99
 - Smooth 94
- Common polypody 106
- Crested wood fern 64
- Cryptogramma 34, **99**
 - stelleri 5, **99**
- Cystopteris 35, **46**
 - bulbifera **46**
 - fragilis 46, **48**
 - fragilis var. fragilis **48**
 - fragilis var. mackayii **50**
- Dennstaedtia 34, **77**
 - punctilobula **77**
- Dryopteris 4, 35, **59**
 - Xboottii 60, **70**
 - cristata var. clintoniana **64**
 - cristata var. cristata 60, **64**, 70, 72
 - disjuncta* 51
 - goldiana 5, 59, **62**
 - marginalis 34, 59, **60**
 - novaboracensis* 55
 - phegopteris* 53
 - spinulosa var. spinulosa 5, 60, **66**, 70
 - spinulosa* var. *fructuosa* 70
 - spinulosa var. intermedia **68**, 70, 72
 - thelypteris*
 - var. *pubescens* 57
- Eastern holly fern 75
- Fern family 34
- Florist's fern 66
- Flowering fern family 26
- Fragile fern 48
- Goldie's fern 62
- Grape fern
 - Branching 18
 - Cut-leaved 12
 - Lance-leaved 20
 - Leathery 10
 - Small 16
- Gymnocarpium 35, **50**
 - dryopteris 4, **51**
 - f. glandulosa **51**
- Hay-scented fern 77
- Interrupted fern 28

- Lady fern 83
 Long beech fern 53
 Maidenhair fern 101
 Marginal shield fern 60
 Marsh fern 57
 Matteuccia 34, **35**
 struthiopteris
 var. *pensylvanica* **36**
 New York fern 55
 Oak fern 51
 Onoclea 34, **38**
 sensibilis **38**
 f. *obtusilobata* **38**
 Ophioglossaceae **7**
 Ophioglossum 7, **22**
 vulgatum
 var. *pseudopodium* 5, **24**
 Osmunda **26**
 cinnamomea 26, **30**
 f. *frondosa* **30**
 claytoniana 26, **28**, 30
 regalis var. *spectabilis* **26**
 f. *anomala* **28**
 Osmundaceae 7, **26**
 Ostrich fern 36
 Pellaea 34, **92**
 atropurpurea 4, 5, **92**, 94
 glabella 4, 92, **94**
 Phegopteris 35, **53**
 connectilis 4, **53**
 polypodioides **53**
 Polypodiaceae 4, 7, **34**
 Polypodium 35, **106**
 virginianum **106**
 Polystichum 34, **72**
 acrostichoides 72, **73**
 f. *incisum* **73**
 braunii var. *purshii* 5, 6, 72, **75**
 Pteretis
 nodulosa 36
 pensylvanica 36
 Pteridium 34, **103**, 105
 aquilinum 5
 aquilinum var. *latiusculum* **103**
 latiusculum 103
 Rattlesnake fern 22
 Royal fern 26
 Sensitive fern 38
 Spinulose wood fern 66
 Spleenwort
 Ebony 90
 Maidenhair 88
 Narrow-leaved 79
 Silvery 81
 Thelypteris **55**
 cristata 64
 cristata var. *clintoniana* 64
 dryopteris 51
 goldiana 62
 marginalis 60
 noveboracensis **55**
 palustris var. *pubescens* 4, 55, **57**
 phegopteris 53
 spinulosa 66
 Virginian chain fern 96
 Walking fern 86
 Woodsia 34, **40**
 Blunt-lobed 42
 ilvensis **40**
 obtusa 4, 40, **42**
 oregana 4, 40, **44**
 Oregon 44
 Rusty 40
 Woodwardia 35, **96**
 virginica 5, **96**

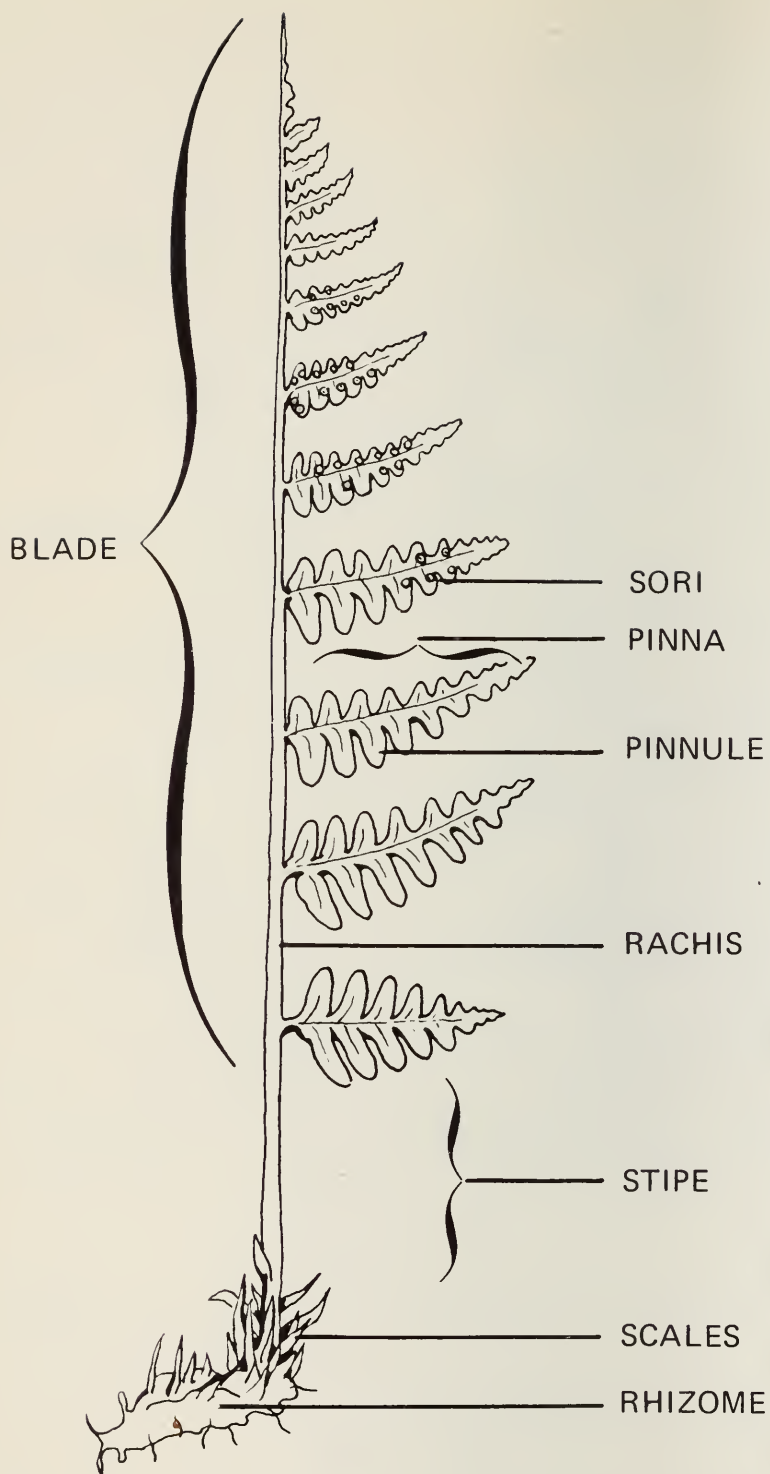
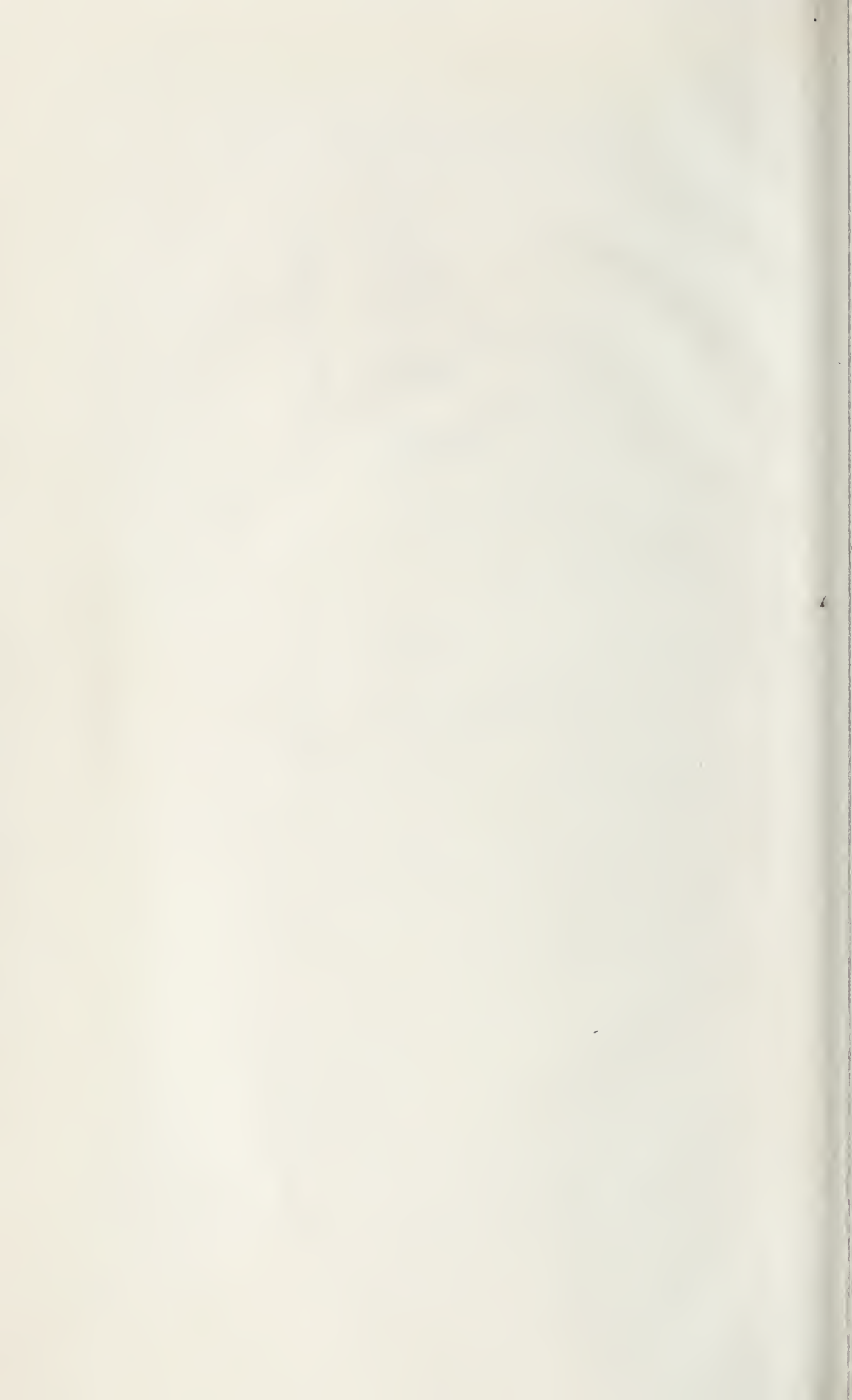
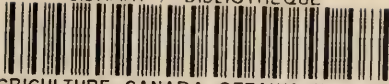


Fig. 47. Illustration of fern parts





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